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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MICHAEL J. TSECOURAS

Appeal 2008-6084
Application 10/068,492[1]
Technology Center 2600

Decided:[2] March 31, 2009

Before JOSEPH F. RUGGIERO, MAHSHID D. SAADAT, and MARC S. HOFF, *Administrative Patent Judges*.

HOFF, *Administrative Patent Judge*.

DECISION ON APPEAL

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[1] The real party in interest is Texas Instruments Incorporated.

[2] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF CASE

Appellant appeals under 35 U.S.C. § 134 from a Final Rejection of claims 1-29. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Appellant's invention relates to a switching amplifier that does not produce electromagnetic interference (EMI) in certain critical frequency bands. Adaptive pulse frame rate frequency control is used to change the digital switching amplifier frequency, via a Programmable Digital Asynchronous Sample Rate Converter (Spec. 4). The control system of the invention includes a look-up table or algorithm to determine a proper pulse frame frequency necessary to eliminate critical frequency band interference (Spec. 5).

Claim 1 is exemplary:

> 1. A digital amplifier adaptive pulse frame rate frequency control system comprising:
>
> a sample rate converter;
>
> a programmable controller operational in response to user selected input frequency data to generate control data bits; and
>
> a system clock generator operational to generate a sample rate converter master clock signal in response to the control data bits such that the sample rate converter generates output data at a sample rate determined by the control data bits.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Groshong	US 5,301,366	Apr. 5, 1994
Orndorff	US 5,640,697	Jun. 17, 1997
Schubert	US 2001/0033628 A1	Oct. 25, 2001
Midya	US 2002/0180518 A1	Dec. 5, 2002 (filed May 31, 2001)

Claims 1-5, 11-15, 18-21, 24, 25, 28, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schubert, Orndorff, and Groshong.

Claims 6-10, 16, 17, 22, 23, 26, and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schubert in view of Orndorff, Groshong, and Midya.

Throughout this decision, we make reference to the Appeal Brief ("Br.," filed Mar. 9, 2007) and the Examiner's Answer ("Ans.," mailed Jul. 19, 2007) for their respective details.

ISSUES

Appellant argues that the Examiner erred in rejecting the claims over the combination of Schubert, Orndorff, and Groshong, because (a) Schubert's controller is not programmable (Br. 6), (b) Schubert does not teach user selection to control the sampling rate conversion (Br. 6), and (c) neither Orndorff nor Groshong teaches user control of the sampling rate converters of Schubert (Br. 7). The Examiner argues that the combination teaches all the elements of the claimed invention (Ans. 15-16), and provides reasons why the combination would have been obvious to the skilled artisan (Ans. 5).

The respective contentions of Appellant and the Examiner thus present us with the following issues:

Has Appellant shown that the Examiner erred in finding that Schubert teaches a programmable controller?

Has Appellant shown that the Examiner erred in finding that the combination of Schubert, Orndorff, and Groshong fairly suggests a

programmable controller operable in response to user selected input frequency data to generate control data bits?

FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

The Invention

1. According to Appellant, the invention concerns a switching amplifier that does not produce electromagnetic interference (EMI) in certain critical frequency bands. Adaptive pulse frame rate frequency control is used to change the digital switching amplifier frequency, via a Programmable Digital Asynchronous Sample Rate Converter (Spec. 4). The control system of the invention includes a look-up table or algorithm to determine a proper pulse frame frequency necessary to eliminate critical frequency band interference (Spec. 5).

Schubert

2. Schubert teaches sample rate control via a device that receives and processes signals from a communications link and supports a plurality of signal protocols, comprising a digital filter that receives a single sampled data stream, wherein the device supports at least two of the plurality of signal protocols through the digital filter (¶¶ [0001], [0026]).

3. The digital signal processor (DSP) 620 of Schubert receives a sampled data stream having a variable sample rate (¶ [0144]). The sampled data stream is subjected to a fast Fourier transform (FFT), the output of which is coupled to a phase detector, whose output is passed through a digital filter to produce a sample rate control signal (¶ [0145]). The DSP of

Schubert thus produces a signal to maintain phase and/or frequency lock with a transmitter (not shown) (¶ [0144]).

Orndorff

4. Orndorff teaches a receiving system capable of avoiding spurious receiver responses (spurs) by combined switching of multiple local oscillator frequencies (col. 1, ll. 56-58).

5. Orndorff teaches a programmable controller operational in response to input frequency data to generate control data bits (col. 8, ll. 12-16; col. 11, l. 59 – col. 12, l. 8).

Groshong

6. Groshong teaches high resolution frequency tuning for radio transmitters and receivers (col. 1, ll. 6-8).

7. Groshong teaches user selection of the input frequency to which a programmable controller is to respond (col. 4, ll. 35-40).

Midya

8. Midya teaches a switching amplifier including a digital correction circuit for correcting nonlinearity and power supply noise introduced during power stage amplification (Abstract).

PRINCIPLES OF LAW

> Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'

KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences

between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.").

In *KSR*, the Supreme Court emphasized "the need for caution in granting a patent based on the combination of elements found in the prior art," *id.* at 1739, and discussed circumstances in which a patent might be determined to be obvious. In particular, the Supreme Court emphasized that "the principles laid down in *Graham* reaffirmed the 'functional approach' of *Hotchkiss*, 11 How. 248," and reaffirmed principles based on its precedent that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 127 S. Ct. at 1739 (citing *Graham*, 383 U.S. at 12). The Court explained:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Id. at 1740. The operative question in this "functional approach" is thus "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.*

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). The test of obviousness is what the combined teachings would have suggested to those of ordinary skill in the art. *See In re Kahn*, 441 F.3d 977, 987-88 (Fed. Cir. 2006); *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991); *Keller*, 642 F.2d at 425.

ANALYSIS

CLAIMS 1-5, 11-15, 18-21, 24, 25, 28, AND 29

We select claim 1 as representative of the claims, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellant argues that the Examiner erred in rejecting claim 1 over the combination of Schubert, Orndorff, and Groshong because Schubert does not teach the claimed "programmable controller" (Br. 6). This argument is not persuasive of Examiner error. The digital signal processor (DSP) 620 of Schubert, cited by the Examiner as meeting the "programmable controller" limitation, receives a sampled data stream having a variable sample rate (FF 3). The sampled data stream is subjected to a fast Fourier transform (FFT), the output of which is coupled to a phase detector, whose output is passed through a digital filter to produce a sample rate control signal (FF 3). The DSP of Schubert thus produces a signal to maintain phase and/or frequency lock with a transmitter (not shown) (FF 3). We therefore find that the controller 620 of Schubert is indeed "programmable."

Appellant further argues that Schubert does not teach user selection to control the sampling rate conversion (Br. 6). This argument is likewise

unpersuasive, because the Examiner relies on Orndorff and Groshong, rather than Schubert, to teach this feature.

Appellant further argues that Orndorff and Groshong fail to suggest user control of the sampling rate converters in Schubert. We find this argument unpersuasive of Examiner error, because it constitutes an attack on individual references where the rejection is based on the combination. *Keller*, 642 F.2d at 425. In any event, the Examiner relies on Orndorff to teach a programmable controller operational in response to input frequency data to generate control data bits (FF 5), and relies on Groshong to teach user selection of the input frequency to which the programmable controller is to respond (FF 7). We concur in the Examiner's conclusion that it would have been obvious to combine the teachings of Schubert, Orndorff, and Groshong to obtain a frequency control system in which the programmable controller responds to input frequency data, and specifically a user selected frequency, as claim 1 requires, to achieve the advantage of reduced or eliminated EMI in the frequency band(s) of interest (Ans. 5).

Appellant has not demonstrated error in the Examiner's rejection. Accordingly, we will sustain the rejection of claims 1-5, 11-15, 18-21, 24, 25, 28, and 29 under 35 U.S.C. § 103(a).

CLAIMS 6-10, 16, 17, 22, 23, 26, AND 27

Appellant "relies upon the patentability of base claims 1, 12, 18, and 25" for these dependent claims. Therefore, because we sustain the rejection of independent claims 1, 12, 18, and 25, *supra*, we will also sustain the rejection of dependent claims 6-10, 16, 17, 22, 23, 26, and 27 under 35 U.S.C. § 103, for the same reasons.

CONCLUSIONS OF LAW

Appellant has not shown that the Examiner erred in finding that Schubert teaches a programmable controller.

Appellant has not shown that the Examiner erred in finding that the combination of Schubert, Orndorff, and Groshong fairly suggests a programmable controller operable in response to user selected input frequency data to generate control data bits.

ORDER

The Examiner's rejection of claims 1-29 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

babc

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